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Millets and its Importance: A Review

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ABSTRACT

Now a day's human do not follow proper diet and life style as they do not perform any physical activity and consuming more fast food as a result they suffer from many life style disorders. So nutritious diet and physical activity play a key role in maintaining good health. Balanced diet should contain fresh fruits, fresh vegetables, whole grains, legumes, nuts, lean proteins etc. In *ayurveda* food *(ahar*) is considered as a medicine (*aushadh*). After digestion this food nourishes all the tissues (*Dhatus*) of the body in proper way. So we should always eat healthy food. Due to higher nutrients content of Millets we should include Millets in our diet. It is improving gastrointestinal health, blood lipid profile and blood glucose clearance. It is boon for celiac disorder and diabetes as it contains minimal gluten and low glycemic index. Primary source of data is pub med, Google scholar and various peer reviewed journals, previous studies conducted on similar subject at different universities and other research centers. Millets have many beneficial effects on our body so it should be included in our diet on daily basis.

Key words: *Ayurveda*, *Dhoopan,* Fumigation, Microorganism.

Today's human do not follow proper diet and life style means they do not perform any physical activity and consuming more fast food as a result they suffer from many life style disorder like diabetes, obesity, hypothyroidism, psychological problems, anxiety *etc*. According to WHO life style diseases contribute 15 million deaths occur among people in the age band of 30 to 69 years. ICMR data shows that proportion of all deaths due to non communicable diseases (NCDs) has increased from 37.09% in 1990 to 61.8% (2016 pib.gov). The rate of incidence of NCDs has more than doubled among the children between 5-7 years of age over the past decade. Most of the communicable disease has their origin in child hood. Physical activity, unhealthy diet, exposure to alcohol and tobacco, academic pressure, social anxieties, unhealthy and unsafe environment are important risk factors.

So in present era Diet and physical activity plays a key role in growth and proper development of child. Nutrient deficient diets hinder children's short and long-term physical, mental and emotional development, affecting not only individual development but also economic and social development of the country. For healthy life we should eat balanced diet. Balanced diet should contain fresh fruits, fresh vegetables, whole grains, legumes, nuts, lean proteins *etc*. Due to higher nutrients content of Millets we should include Millets in ourdiet for healthy life. But use of millets should be wise according to condition and requirement of human. Millets provide many health benefits like it lower the cholesterol, helpful in diabetes, GIT disorders and cardiac disorders and in many more disorders. So we should add the millets in our diet schedule according to our need.

For the present study the primary source of data is pub med, Google scholar and various peer reviewed journals, previous studies conducted on similar subject at different universities and other research centers. Information available on internet is also incorporated in the study.

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What is millet?

Millets are small seeded grasses, highly nutritious and well suited to diverse climatic conditions. Millets are grown in low fertile land, tribal and rain fed and mountainous areas. Different types of millet are Jwar (sorghum), Bajra (pearl millet), Ragi (finger millet), Jhangora (barnyard millet), Barri (Proso or common millet), Kanguni (foxtail/ Italian millet), Kodra (Kodo millet) *etc*. Each millet is nutritionally superior to rice and wheat in terms of proteins, minerals and vitamins. Millets are cultivated in Haryana, Uttar Pradesh, Chhattisgarh, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu and Telangana. Millets can develop from seed to ready to harvest crops in just about 65 days.

Production in India

In India, eight millets species (Sorghum, Pearl millet, Finger millet, Foxtail millet, Kodo millet, Proso millet, Barnyard millet and Little millet) are commonly cultivated. Pearl millet and sorghum are primary crop and allied crops respectively in the desert regions of Rajasthan, in the eastern parts of Rajasthan and Gujarat it is the opposite. Similarly, sorghum is sown as major crop inthe Telangana

Andhra Pradesh, Maharashtra and parts of Central India. Likewise, Finger millet is a primary crop in Tamil Nadu and Gujarat, while the same is a minor crop in Telangana. Hence, the spatial distribution of millets either as a primary crop or as allied crops largely depends on the growing habitat and the amount of rainfall the region receives. While sorghum predominates in areas receiving annual rainfall beyond 400 mm, pearl millet rivals it in areas with annual rainfall of 350 mm. Further, the small millets like fingermillet, foxtail millet, barnyard millet, little millet and proso millet are found in most of the southern and central states inIndia especially wherever annual rainfall is below 350 mm.

Millet as a first food

Our traditional food system has a major role in maintaining health of well being. In ancient era millets were the first crops that are consumed by humans and it also consumed by the Indus valley people (3000 BC). In Southern India *Ragi* or malt powder is used as first foods for infant as it contain calcium and vitamin C and other essential nutrients. Calcium helps in absorption of Vitamin D that is good for bones and teeth and vitamin C helps in absorption of Iron that prevents anemia in children. *Ayurveda* described the millets as therapeutic as well as preventive aspects.

In infants during weaning process there is always the need to introduce soft, easily swallowed foods to supplement the infant's feeding early in life. A process weaning diet from pearl millet conophornut flour was found to promote growth in a clinical experiment (Akeredolu *et al*., 2005); whereas, weaning food blends prepared from fermented pearl millet/roasted cow pea in 70:30 and 60:40 ratios were reported to have resulted in lower levels of phytic acid and higher in vitro protein digestibility of the weaning food blends (Laminu *et al*., 2011).

Millet and child health

With regard to the Global Hunger Index-GHI, India ranks 64 among the 81 nations (https://www.globalhungerindex.org/ranking.html). It occupies second place in child malnutrition highlighting the poor plight of our country. This scenario persists when the Public Distribution System and Targeted PDS are working for nearly five decades. The reason is that the focus has been only on wheat and rice distribution while the millets have long been disregarded.Among the food crops, millets occupy a relatively lower position in Indian agriculture, though they are really important from the point of food security atthe regional and household level. Bearing this in mind, below given are points that highlight the importance of millets (Table 1).

Description of millets as per *ayurveda*

Acharya Charaka has mentioned millets under classification of diet in *Shook Dhanya Varga* in chapter *Annapanvi dhiyaadhyaya* 27 (Yadav, 2013). *Acharya Charaka* included following millets in *Shookdhanya* are-*Kanguni* (barak), *Uddalak* (vankodo), *Cheena* (cheen), *Sharad*, *Ujjawal, Dardur, Gandhan, Guruvinda, Kordush* (*kodo), Shyamak (sava), Hasti Shyama (bada Sava), Niwar (Tinni rice), Toyaparni, Gavedhuk, Prashatika, Ambhashayama, Lohitanu, Priyangu, Mukunda, Jhinti, Garmuti, Varuk, Varak, Shivir, Utakat, Jurnaha*.

In another chapter *Acharya Charaka* described some substances that should be used on daily basis. These substances are *sathi* rice, *moong daal*, *saindhav* salt, *amla,* floor of barley (*yava* or *jau*), rain water, milk, *jangal mansa* and *madhu*. He said red rice (*lal dhan*) should be taken on regular basis. He also mentioned some more substances that we should not be consumed on daily basis that are *valloor* (dry meat), dry *shaak, shalook* (*kamalkanda*), *bisa*, *kurchika* (malai), *kilata*, pork, cow meat, buffalo meat, fish, curd, *urad, yava*.

Acharya Sushruta includes millet in *kudhanya varga*. So from the thought of both *Acharyas* millets should not indulged as a daily basis, but these are selected in diet charts according to our need as these millets are beneficial in many disorders so these can be used as a *pathya ahar* (Table 2).

Indication of millets in different seasons

***Sharad Ritu* (Winter season)**

In *Sharad Ritu shali rice, yava, godhum* should be used.

***Greeshma Ritu* (Summer season)**

Shali rice.

Table 1: Nutritive values of millets and other cereals.

Grains	Protein	Carbohydrate	Fat	Fiber	Ash	Moisture	Calorific value (kcal)
Barnyard millet	10.76-13	55.7-74	3.5-4.8	3.9-13.6	3.3-4.6	7.78-11.24	300-310
Finger millet	7.3-10	71.52-83.3	1.30-1.8	3.4-4.2	2.63-2.8	7.68-13.1	328-334
Pearl millet	10.6-11.8	59.8-75.6	4.8-5.7	1.3-2.3	1.64-2.2	12.4	363-412
Foxtail millet	11.34-12.3	60.2-75.2	3.33-4.3	4.1-8.7	3.37	7.69-11.2	330-352
Proso millet	11.74-13	67.09-82	1.1-4.9	2.2-8.47	2.73-4	11.9	330-352
Kodo millet	8.3-10.2	63.82-73.5	1.4-3.9	5.2-9.5	2.83-3.6	8.06-10.83	309-349.5
Little millet	7.7-10.7	66.3-75	4.7-6	4-7.6	2.5-5.9	8.56-11.98	329-341
Sorghum	11	70.7-72.97	3.23	1.97-6.7	1.6-1.7	6.07-11.16	329-339
Rice	4.99-6.94	74.3-82.86	1.90	1.63	0.99	11.6	369
Wheat	11.6-13.78	69.88-75.90	1.5-2.81	1.77	1.63	9.44	348-438

***Vasanta Ritu* (Spring season)**

Old yava, wheat.

Barnyard millets

It contains highly digested protein and dietary fiber with a good balance of soluble and insoluble components (Renganathan *et al.*, 2020). Linoleic acid is the main fatty acid in barnyard millet, followed by palmitic and oleic acid. Additionally, it exhibits a strong retrogradation of amylase, which promotes the creation of more resistant starches.

Common name

Indian Barnyard Millet or Billion dollar grass (English), *Sanwa* (hindi), *Shyama* (Sanskrit), *Jhangora* (Uttarakhand), *Morio* (Gujarati), *Kauda, Kautta, Kowda, Kowtta* (Malayalam), *Udali/Kodisama* (Telugu), *Shamula* (Bengali) and *Kuthiaivaali* (Tamil).

It is useful in the treatment of constipation and atopic dermatitis, lowering blood glucose and lipid levels therefore can be potentially recommended for patients of cardiovascular disease and diabetes mellitus (Perumal *et al.*, 2019; Chopra *et al.*, 1986). It is a good antioxidant, ant carcinogenic, anti-inflammatory, antimicrobial and having wound healing property. Due to its high iron content it is useful in pregnancy (Watanabe, 1999).

Finger millets

Common name

Mandua, Ragi, Mandika (Hindi); *Marwa* (Bengali); *Mandia* (Oriya); *Nagli,Bavto* (Gujarati); *Keppagi, ragi, kelvaragu* (Tamil); *ragichodi* (Telugu).

Finger millet is hypoglycemic (Ambre *et al.*, 2020), hypocholestrolemic in characteristics, antitumerogenic, antidiarrheal, antiinflammatory, atherosclerogenic, antimicrobial and antiulcerative properties (Rathore *et al.*, 2019). It reduce the risk of gastrointestinal malignancies, type II diabetes, cardiovascular diseases and a variety of other illnesses (Kumari and Sumathi, 2002). It is an excellent source of calcium and iron (Sharma and Yamer, 2022).

Pearl millets

Common name

Spiked millet or Pearl Millet (English), Bajra (Bengali, Hindi, Oriya, Punjabi,Urdu),Bajree (Rajasthani), Sajje (Kannada), Kambu (Tamil), Sajja (telugu).

Pearl millet helps in reducing respiratory disease, migraine and gall stones (Dube *et al.*, 2021). It is reported to have ant cancerous, ant diabetic, antioxidant, anti-inflammatory property (Ragaee, 2006). It helps in increasing hemoglobin, ant allergic, helps in dealing with constipation, ant ulcerative properties, helps in weight loss and essential for bone growth and development, prevents cardio-vascular diseases, regulates blood pressure, helpful in celiac disease (Malik, 2015).

Foxtail millet

Common name

Foxtail Millet (English), *Kangni, Rala* (hindi), *Navane* (kannada), *Korra* (Teugu).

It possess several health benefits like prevention of cancer, hypoglycemic and hypolipidemic effects, curing dementia, helps in maintaining cholesterol level, antiproliferative activity, antilipidemic activity (Sharma and Niranjan, 2018), reduces inflammation, potentially promoting anticancer, antiaging and improves the overall digestive health, increases kidney functionality, helps in development of body tissue and energy metabolism (Wandhekar *et al.*, 2021).

Porso millets

Common name

Proso Millet (English), *Barri* (Hindi), *Baragu* (Kannada), *Varigulu* (Telugu), *Panivargu* (Tamil).

Proso Millet is potentially helpful in preventing cancer, heart disease and managing liver disease and diabetes (Bhat *et al.,* 2019). It also slows down the aging process and may protect against age-onset degenerative diseases (Agarwal and Chauhan, 2019).

Little millets

Little millet (English); *kutki* (Hindi); *same* (Kannada); *sama* (Telugu); *samai* (Tamil); *chama* (Malayalam).

Little millet is effective in Diabetes, reduces blood glucose level, improves heart health, good for lowering cholesterol level, helps in weight loss (Bhat *et al.*, 2017). It exhibits hypoglycemic and hypolipidemic effects (Patil, 2015) and prevents metabolic disorder (Kumar *et al.*, 2022).

Kodo millets

Kodo millet has numerous health benefits like antidiabetic, antioxidant, antimicrobial, ant obesity, ant cholesterol,

Table 2: Congenial diet in diseases.

Disease	Millets
Rakta Pitta (Hemorrhagic disorder)	Shali rice, sathi rice, neevar (tinni rice), kodo, sanwa, prashantika, kaguni
Gulma	Old rice
Prameha (Diabetes)	Old shali rice, sava, kodo, jau
Rajyakshma (Tuberculosis)	Yava, Wheat and Shali rice
Urahshat	Yava
Shoth (Swelling)	Sathi rice
Udarroga (GIT disorders)	Red rice, Jau
Grahni (Intestinel disorders)	Rice, Wheat

antimutagenic, antioestrogenic, anticarcinogenic, antiinflammatory, antihypertension and antiviral effects (Bunkar *et al*., 2021, Kumari and Nazni, 2021). It is useful in curing asthma, migraine, blood pressure, aging, heart attack, cardiovascular disease and atherosclerosis (Sharma *et al*., 2017).

Sorghum

Sorghum is beneficial in curing diseases such as obesity, diabetes, celiac disease, dyslipidemia, cardiovascular disease, cancer, heart diseases, dyslipidemia, maintains cholesterol level, bone health, hypertension and prevents anemia. The grain also has antioxidant, anti-inflammatory, antimicrobial, antithrombotic and anticancer activity (Pontieri *et al*., 2022; Rashwan *et al.,* 2021, Mohamed *et al.,* 2022).

Millets have high dietary fiber so it is helpful in improving gastrointestinal health, blood lipid profile and blood glucose clearance. It is boon for celiac disorder and diabetes because it contains minimal gluten and low glycemic index.

Millets are healthy option for children because it contains photochemical such as phytosterols, polyphenols, phytocyanins, lignins and phyto-oestrogens. These photochemical act as antioxidants, immunological modulators and also prevent age-related degenerative illnesses such as cardiovascular diseases, type-2 diabetes and cancer. So we can say millets are helpful in maintaining our general health.

CONCLUSION

From the above study we can conclude that millets are beneficial for our health and it prevents many life style disorders. But there is need for many more study on millets and there should be more production in our country and others awareness programmed regarding millets should be started by the government.

Conflict of interest

All authors declared that there is no conflict of interest.

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